



UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/518,204 03/03/00 KEUNG HO

P CS99-060

EXAMINER

IM52/1023

George O Saile
20 McIntosh Drive
Poughkeepsie NY 12603

SMETANA, J

ART UNIT

PAPER NUMBER

1746

DATE MAILED:

10/23/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/518,204

Applicant(s)

KEUNG HO ET AL.

Examiner

Jiri F. Smetana

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10-13 and 16-18 is/are rejected.
- 7) ☒ Claim(s) 2,9,14 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

DETAILED ACTION

Drawings

1. This application has been filed with formal drawings which are acceptable for examination.

Claim Objections

2. Claims 7, 8, and 14 are objected to because of the following informalities:

Claim 7, line 2, replace [comprising] with --consisting of-- so as to conform with proper Markush language. See MPEP 2173.05(h). Also, on line 2, replace [an] with --a-- before “Cu alloy”.

Claim 8, line 14, delete the typographical error/repeated phrase [includes at least].

Claim 14, line 14, delete the typographical error/repeated phrase [includes at least].

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4-6, 11-13, and 16-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims 4, 11, and 16, it is unclear as to whether the “HF or (CH₃)N(OH)” are part of the previous Markush group. It is suggested that Applicant amend these claims in line 2 and replace [HF or (CH₃)N(OH)] with --an acid or base of HF or (CH₃)N(OH)--.

As to claims 5, 6, 12, 13, 17, and 18, the fractional composition of the carbonyl derivative of benzotriazole is indefinite because these claims do not recite whether the fractional composition is based on volume%, weight%, mass%, etc.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3, 4, 7, 8, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al., U.S. Patent No. 5,770,095, in view of Ho, U.S. Patent No. 6,123,088.

Sasaki discloses a polishing method comprising of forming a layer made of material containing a metal of copper as a main component over a substrate having recessed portions on a surface thereof so as to fill the recessed portion with the metal layer (Figures 2A and 2B); polishing the metal layer by a chemical mechanical polishing method using a slurry including a polishing agent containing a chemical agent containing a chemical agent being responsible for forming a protective film on the surface of the metal layer by reacting with the material containing a metal as a main component, wherein the chemical agent includes a benzotriazole (column 3, lines 37-54), and an etching agent of H₂O₂, HF, and amino acid being responsible for etching the material containing a metal as a main component (column 4, lines 1-12; column 8, lines 29-32).

Sasaki does not disclose wherein the chemical agent includes at least a carbonyl derivative of benzotriazole. However, Ho discloses wherein the chemical agent includes at least a carbonyl derivative of benzotriazole (column 2, lines 55-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the inventions of Sasaki in view of Ho wherein the chemical agent includes at least a carbonyl derivative of benzotriazole because Ho teaches that a carbonyl derivative of benzotriazole typically exhibit improved corrosion protection for copper surfaces in comparison with the nitrogen unsubstituted benzotriazole parent material from which they are derived (column 2, lines 55-67).

Allowable Subject Matter

7. Claim 14 is objected to because of minor informalities and claim 15 is objected to as being dependent upon an objected base claim.
8. Claims 2 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
9. Claims 5, 6, 12, 13 and 16-18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
10. The following is a statement of reasons for the indication of allowable subject matter:

Recitation of Sasaki is repeated here from above. However, Sasaki fails to disclose wherein the carbonyl derivative of benzotriazole has the specific substituent R selected from the

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group consisting of -CH₃, -CH₂CH₃, -CH₂CH₂CH₃, CH₂CH₂CH₂CH₃, -C(CH₃)₃, p-tolyl, 1-benzotriazolyl-1-butamido, 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-thiophenyl, and 3-thiophenyl.

Recitation of Ho is repeated here from above. However, Ho fails to disclose wherein the carbonyl derivative of benzotriazole has the specific substituent R selected from the group consisting of -CH₃, -CH₂CH₃, -CH₂CH₂CH₃, CH₂CH₂CH₂CH₃, -C(CH₃)₃, p-tolyl, 1-benzotriazolyl-1-butamido, 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-thiophenyl, and 3-thiophenyl.

Urasaki et al., U.S. Patent No. 5,689,879, discloses a method of etching copper by CMP with derivatives of benzotriazole selected from the group consisting of 1-oxybenzotriazole, 1-N-benzoyl-benzotriazole, 1-N-acetylbenzotriazole, 5-benzotriazole carboxylic acid, 1-hydroxybenzotriazole, and 5-methylbenzotriazole (column 6, lines 23-43). However, Urasaki fails to teach or disclose wherein the carbonyl derivative of benzotriazole has the specific substituent R selected from the group consisting of -CH₃, -CH₂CH₃, -CH₂CH₂CH₃, CH₂CH₂CH₂CH₃, -C(CH₃)₃, p-tolyl, 1-benzotriazolyl-1-butamido, 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-thiophenyl, and 3-thiophenyl.

Bayes et al., U.S. Patent No. 6,261,466, discloses a method of manufacturing a circuit board by planarizing copper with unsubstituted and substituted benzotriazoles having alkyl groups of 1 to 4 carbon atoms. However, Bayes also fails to teach or disclose wherein the carbonyl derivative of benzotriazole has the specific substituent R selected from the group consisting of -CH₃, -CH₂CH₃, -CH₂CH₂CH₃, CH₂CH₂CH₂CH₃, -C(CH₃)₃, p-tolyl, 1-benzotriazolyl-1-butamido, 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-thiophenyl, and 3-thiophenyl.

Yasutaka et al., JP 08-083780, discloses an abrasive and polishing method of planarizing a copper film with benzotriazole. However, Yasutaka also does not teach or disclose wherein the

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carbonyl derivative of benzotriazole has the specific substituent R selected from the group consisting of -CH₃, -CH₂CH₃, -CH₂CH₂CH₃, CH₂CH₂CH₂CH₃, -C(CH₃)₃, p-tolyl, 1-benzotriazolyl-1-butamido, 2-pyridyl, 3-pyridyl, 4-pyridyl, 2-thiophenyl, and 3-thiophenyl.

Examiner's Note

11. The words "improved," "improvement of," and "improvement in" are not considered as part of the title of an invention and the Office does not include these words at the beginning of the title of the invention. See MPEP 606.01. The current title of Applicant's invention is: "Chemical Agent Additives in Copper CMP Slurry".

Conclusion

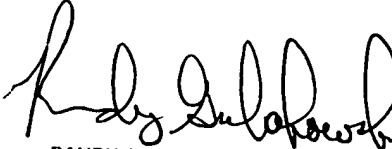
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jiri F. Smetana whose telephone number is (703)605-1173. The examiner can normally be reached on Monday-Friday (7:30am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on (703)608-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-7718 for regular communications and (703)305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

Jiri F. Smetana
Patent Examiner
Art Unit 1746

jfs
October 20, 2001


RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700